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Translation of [0012] and [0021] in Detailed Explanation of
Specification

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[0012]

[Means to Solve the Problems] The present invention relates to a heterojunction bipolar transistor including an n-type collector layer, a p-type base layer, and an n-type emitter layer on a semiconductor substrate, these layers consisting of a III-V compound semiconductor film, the n-type emitter layer having a forbidden band gap larger than that of the p-type base layer, which heterojunction bipolar transistor is characterized in that said p-type base layer is doped as a p-type dopant with impurities consisting of atoms which do not belong to the III or V group, one of the impurities having a larger atomic radius and another of the impurities having a smaller atomic radius compared with constituent atoms of said p-type base layer.

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[0021] In Fig. 1, a buffer layer 11 (100 nm) consisting of i-GaAs or i-AlGaAs is formed on a semi-insulating GaAs substrate 10, and an n-GaAs collector layer 12 (1000 nm) doped with $5 \times 10^{17} \text{ cm}^{-3}$ of Si is formed on this buffer layer 11. A p-GaAs base layer 13 (80 nm) doped with $2 \times 10^{19} \text{ cm}^{-3}$

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of C (atomic radius: 0.77 Å) and $2 \times 10^{19} \text{ cm}^{-3}$ of Mg (atomic radius: 1.40 Å) is formed on the collector layer 12. It is noted that the atomic radiuses of Ga and As are 1.26 Å and 1.18 Å respectively, and the base layer 13 is doped with Mg as an impurity having a larger atomic radius and with C as an impurity having a smaller atomic radius compared with the constituent atoms of the base layer 13.

Translation of [Fig.1] and partial translation of
[Explanation of Letters or Numerals] relating thereto in
Brief description of the Drawings

[Fig. 1] Fig. 1 shows a cross-sectional view of one embodiment of a heterojunction bipolar transistor of the present invention.

[Explanation of Letters or Numerals]

- 10 Semi-insulating GaAs Substrate
- 11 Buffer Layer (i-GaAs or i-AlGaAs)
- 12 Collector Layer (n-GaAs)
- 20 13 Base Layer (p-GaAs)
- 14 Emitter Layer (n-AlGaAs or n-InGaP)
- 15 Emitter-cap Layer (n^+ -GaAs)
- 20 Collector Electrode (Ni/AuGe/Au Alloy)
- 21 Base Electrode (Ti/Pt/Au)
- 25 22 Emitter Electrode (WSi)

Drawing of Fig. 1

Fig. 1 [図1]

